

**FCC 312
Schedule S**

**FEDERAL COMMUNICATIONS COMMISSION
SATELLITE SPACE STATION AUTHORIZATIONS
(Technical and Operational Description)**

**Page 1: General,
Frequency Bands,
and GSO Orbit**

S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name: DIRECTV KU-76W		e. Estimated Date of Placement into Service:	i. Will the space station(s) operate on a Common Carrier Basis: N
b. Construction Commencement Date:		f. Estimated Lifetime of Satellite(s): 15 Years	j. Number of transponders offered on a common carrier basis:
c. Construction Completion Date:		g. Total Number of Transponders: 24	k. Total Common Carrier Transponder Bandwidth: MHz
d1. Est Launch Date Begin:	d2. Est Launch Date End:	h. Total Transponder Bandwidth (no. transponders x Bandwidth) 864 MHz	l. Orbit Type: Mark all boxes that apply: ☒ GSO ☐ NGSO

S2. OPERATING FREQUENCY BANDS Identify the frequency range and transmit/receive mode for all frequency bands in which this station will oper
Also indicate the nature of service(s) for each frequency band.

Frequency Band Limits				e. T/R Mode	f. Nature of Service(s): List all that apply to this band
Lower Frequency (Hz)		Upper Frequency (Hz)			
a. Numeric	b. Unit (K/M/G)	c. Numeric	d. Unit (K/M/G)		
11700	M	12200	M	T	Fixed Satellite Service
11700	M	12200	M	T	Direct to Home in the Fixed Fixed Satellite Service
14000	M	14500	M	R	Fixed Satellite Service
17300	M	17800	M	T	Broadcasting Satellite Service - Video
24750	M	25250	M	R	Feeder Link for Broadcasting Satellite Service in FSS

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W): 76.2 W	b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection:
Longitudinal Tolerance or E/W Station-Keeping:	f. Inclination Excursion or N/S Station-Keeping Tolerance:	Range of orbital are in which adequate service can be provided (Optional): Degrees E/W	
d. Toward West: 0.05 Degrees	0.05 Degrees	g. Westernmost:	
e. Toward East: 0.05 Degrees		h. Easternmost:	
i. Reason for service are selection (Optional):			

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Page 2: NGSO Orbits

S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

S4c. Celestial Reference Body (Earth, Sun, Moon, etc.):

S4b. Total Number of Orbital Planes in Network or System:

S4d. Orbit Epoch Date:

For each Orbital Plane Provide:

(e) Orbital Plane No.	(f) No. of Satellites in Plane	(g) Inclination Angle (degrees)	(h) Orbital Period (Seconds)	(i) Apogee (km)	(j) Perigee (km)	(k) Right Ascension of the Ascending Node (Deg.)	(l) Argument of Perigee (Degrees)	Active Service Arc Range (Degrees)		
								(m) Begin Angle	(n) End Angle	(o) Other

S5. INITIAL SATELLITE PHASE ANGLE For each satellite in each orbital plane, provide the initial phase angle.

(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)
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NO NGSO DATA FILED

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Page 3: Service Areas

S6. SERVICE AREA CHARACTERISTICS for each service area provide:

(a) Service Area ID	(b) Type of Associated Station (Earth or Space)	(c) Service Area Diagram File Name (GXT File)	(d) Service Area Description. Provide list of geographic areas (state postal codes or ITU 3-ltr codes), satellites or Figure No. of Service Area Diagram.
USMEX	S		Western US, Mexico, Central America
MEX+	S		Mexico, Central America, part of Caribbean
MEX	S		Mexico
GBL			Visible earth

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Page 4: Antenna Beams

S7. SPACE STATION ANTENNA BEAM CHARACTERISTICS For each antenna beam provide:

(a) Beam ID	(b) T/R Mode	Isotropic Antenna Gain		(e) Pointing Error (Degrees)	(f) Rotational Error (Degrees)	(g) Min. Cross- Polar Iso- lation (dB)	(h) Polar- ization Switch- able? (Y/N)	(i) Polarization Alignment Rel. Equatorial Plane (Degrees)	(j) Service Area ID	Transmit			Receive				
		(c) Peak (dBi)	(d) Edge (dBi)							(k) Input Losses (dB)	(l) Effective Output Power (W)	(m) Max. EIRP (dBW)	(n) System Noise Temp (k)	(o) G/T Max. Gain Pt. (db/K)	(p) Min. Saturation Flux Density (dBW/m2)	Input Attenuator (dB)	
																(q) Max. Value	(r) Step Size
RKV	R	39.3	33.3	0.1	0.4	30	N	90	USMEX				646	11.2	-98	19	1
RKH	R	39.4	33.3	0.1	0.4	30	N	0	USMEX				646	11.3	-98	19	1
RBR	R	37.7	31.7	0.1	0.1	30	N		USMEX				1047	7.5	-90	17	1
RBL	R	37.7	31.7	0.1	0.1	30	N		USMEX				1047	7.5	-90	17	1
TBR	T	38.1	32.1	0.1	0.1	29	N		MEX	2.6	26.9	52.4					
TBL	T	38.1	32.1	0.1	0.1	29	N		MEX	2.6	26.9	52.4					
TKV	T	35	29	0.1	0.4	29	N	90	MEX+	3.3	63.1	53					
TKH	T	35	29	0.1	0.4	29	N	0	MEX+	3.3	63.1	53					
CMD	R	25.7	19.7	0.1	0.1	27	Y		GBL				1000	-5.2	-96		
TLM	T	25.6	19.6	0.1	0.1	27	Y		GBL	6.6	0.1	15.4					

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Page 5: Beam Diagrams

S8. ANTENNA BEAM DIAGRAMS For each beam pattern provide the reference to the graphic image and numerical data:
Also provide the power flux density levels in each beam that result from the emission with the highest power flux density.

(a) Beam ID	(b) T/R Mode	(c) Co-or Cross Polar Mode ("C" or" X")	(d) GSO Ref. Orbital Longitude (Deg. E/W)	(e) NGSO Antenna Gain Contour Description (Figure/Table/ Exhibit)	(f) GSO Antenna Gain Contour Data (GXT File)	Max. Power Flux Density (dBW/M2/Hz)				
						At Angle of Arrival above horizontal (for emission with highest PFD)				
						(g) 5 Deg	(h) 10 Deg	(i) 15 Deg	(j) 20 Deg	(k) 25 Deg
RKV	R	C	-76.2		V KU-76W_Ku RX_V					
RKH	R	C	-76.2		V KU-76W_Ku RX_H					
TKV	T	C	-76.2		CTV KU-76W_Ku TX_V					
TKH	T	C	-76.2		CTV KU-76W_Ku TX_H					
RBR	R	C	-76.2		V KU-76W_RB RX_R					
RBL	R	C	-76.2		V KU-76W_RB RX_L					
TBR	T	C	-76.2		V KU-76W_RB TX_R	-135	-135	-135	-135	-135
TBL	T	C	-76.2		V KU-76W_RB TX_L	-135	-135	-135	-135	-135

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Page 6: Channels and Transponders

S9. SPACE STATION CHANNELS For each frequency channel provide: **S10. SPACE STATION TRANSPONDERS** For each transponder provide:

(a) Channel No.	(B) Assigned Bandwidth (kHz)	(c) T/R Mode	(d) Center Frequency (MHz)	(e) Polarization (H, V, L, R)	(f) TTC or Comm Channel (T or C)
KUR01	36000	R	14020	V	C
KUR02	36000	R	14060	V	C
KUR03	36000	R	14100	V	C
KUR04	36000	R	14140	V	C
KUR05	36000	R	14180	V	C
KUR06	36000	R	14220	V	C
KUR07	36000	R	14260	V	C
KUR08	36000	R	14300	V	C
KUR09	36000	R	14340	V	C
KUR10	36000	R	14380	V	C
KUR11	36000	R	14420	V	C
KUR12	36000	R	14460	V	C
KUR13	36000	R	14040	H	C
KUR14	36000	R	14080	H	C
KUR15	36000	R	14120	H	C
KUR16	36000	R	14160	H	C
KUR17	36000	R	14200	H	C
KUR18	36000	R	14240	H	C
KUR19	36000	R	14280	H	C
KUR20	36000	R	14320	H	C
KUR21	36000	R	14360	H	C
KUR22	36000	R	14400	H	C
KUR23	36000	R	14440	H	C
KUR24	36000	R	14480	H	C
KUT01	36000	T	11720	H	C
KUT02	36000	T	11760	H	C
KUT03	36000	T	11800	H	C
KUT04	36000	T	11840	H	C
KUT05	36000	T	11880	H	C
KUT06	36000	T	11920	H	C

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
KU001	120	KUR01	RKV	KUT01	TKH
KU002	120	KUR02	RKV	KUT02	TKH
KU003	120	KUR03	RKV	KUT03	TKH
KU004	120	KUR04	RKV	KUT04	TKH
KU005	120	KUR05	RKV	KUT05	TKH
KU006	120	KUR06	RKV	KUT06	TKH
KU007	120	KUR07	RKV	KUT07	TKH
KU008	120	KUR08	RKV	KUT08	TKH
KU009	120	KUR09	RKV	KUT09	TKH
KU010	120	KUR10	RKV	KUT10	TKH
KU011	120	KUR11	RKV	KUT11	TKH
KU012	120	KUR12	RKV	KUT12	TKH
KU013	120	KUR13	RKH	KUT13	TKV
KU014	120	KUR14	RKH	KUT14	TKV
KU015	120	KUR15	RKH	KUT15	TKV
KU016	120	KUR16	RKH	KUT16	TKV
KU017	120	KUR17	RKH	KUT17	TKV
KU018	120	KUR18	RKH	KUT18	TKV
KU019	120	KUR19	RKH	KUT19	TKV
KU020	120	KUR20	RKH	KUT20	TKV
KU021	120	KUR21	RKH	KUT21	TKV
KU022	120	KUR22	RKH	KUT22	TKV
KU023	120	KUR23	RKH	KUT23	TKV
KU024	120	KUR24	RKH	KUT24	TKV
RB001	120	RBR01	RBR	RBT01	TBR
RB003	120	RBR03	RBR	RBT03	TBR
RB005	120	RBR05	RBR	RBT05	TBR
RB007	120	RBR07	RBR	RBT07	TBR
RB009	120	RBR09	RBR	RBT09	TBR
RB011	120	RBR11	RBR	RBT11	TBR

KUT07	36000	T	11960	H	C
KUT08	36000	T	12000	H	C
KUT09	36000	T	12040	H	C
KUT10	36000	T	12080	H	C
KUT11	36000	T	12120	H	C
KUT12	36000	T	12160	H	C
KUT13	36000	T	11740	V	C
KUT14	36000	T	11780	V	C
KUT15	36000	T	11820	V	C
KUT16	36000	T	11860	V	C
KUT17	36000	T	11900	V	C
KUT18	36000	T	11940	V	C
KUT19	36000	T	11980	V	C
KUT20	36000	T	12020	V	C
KUT21	36000	T	12060	V	C
KUT22	36000	T	12100	V	C
KUT23	36000	T	12140	V	C
KUT24	36000	T	12180	V	C
RBT01	36000	T	17326	R	C
RBT03	36000	T	17366	R	C
RBT05	36000	T	17406	R	C
RBT07	36000	T	17446	R	C
RBT09	36000	T	17486	R	C
RBT11	36000	T	17526	R	C
RBT13	36000	T	17566	R	C
RBT15	36000	T	17606	R	C
RBT17	36000	T	17646	R	C
RBT19	36000	T	17686	R	C
RBT21	36000	T	17726	R	C
RBT23	36000	T	17766	R	C
RBT02	36000	T	17326	L	C
RBT04	36000	T	17366	L	C
RBT06	36000	T	17406	L	C
RBT08	36000	T	17446	L	C
RBT10	36000	T	17486	L	C
RBT12	36000	T	17526	L	C
RBT14	36000	T	17566	L	C
RBT16	36000	T	17606	L	C
RBT18	36000	T	17646	L	C

RB013	120	RBR13	RBR	RBT13	TBR
RB015	120	RBR15	RBR	RBT15	TBR
RB017	120	RBR17	RBR	RBT17	TBR
RB019	120	RBR19	RBR	RBT19	TBR
RB021	120	RBR21	RBR	RBT21	TBR
RB023	120	RBR23	RBR	RBT23	TBR
RB002	120	RBR02	RBL	RBT02	TBL
RB004	120	RBR04	RBL	RBT04	TBL
RB006	120	RBR06	RBL	RBT06	TBL
RB008	120	RBR08	RBL	RBT08	TBL
RB010	120	RBR10	RBL	RBT10	TBL
RB012	120	RBR12	RBL	RBT12	TBL
RB014	120	RBR14	RBL	RBT14	TBL
RB016	120	RBR16	RBL	RBT16	TBL
RB018	120	RBR18	RBL	RBT18	TBL
RB020	120	RBR20	RBL	RBT20	TBL
RB022	120	RBR22	RBL	RBT22	TBL
RB024	120	RBR24	RBL	RBT24	TBL
CMD1		CMD1	CMD		
CMD2		CMD2	CMD		
TLM1				TLM1	TLM
TLM2				TLM2	TLM
BCN				BCN	TLM

RBT20	36000	T	17686	L	C
RBT22	36000	T	17726	L	C
RBT24	36000	T	17766	L	C
RBR01	36000	R	24776	R	C
RBR03	36000	R	24816	R	C
RBR05	36000	R	24856	R	C
RBR07	36000	R	24896	R	C
RBR09	36000	R	24936	R	C
RBR11	36000	R	24976	R	C
RBR13	36000	R	25016	R	C
RBR15	36000	R	25056	R	C
RBR17	36000	R	25096	R	C
RBR19	36000	R	25136	R	C
RBR21	36000	R	25176	R	C
RBR23	36000	R	25216	R	C
RBR02	36000	R	24776	L	C
RBR04	36000	R	24816	L	C
RBR06	36000	R	24856	L	C
RBR08	36000	R	24896	L	C
RBR10	36000	R	24936	L	C
RBR12	36000	R	24976	L	C
RBR14	36000	R	25016	L	C
RBR16	36000	R	25056	L	C
RBR18	36000	R	25096	L	C
RBR20	36000	R	25136	L	C
RBR22	36000	R	25176	L	C
RBR24	36000	R	25216	L	C
CMD1	1300	R	14002.5	H	T
CMD2	1300	R	14498	V	T
TLM1	106	T	11701.75	V	T
TLM2	106	T	11702.75	V	T
BCN	0.1	T	12198	H	T

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Page 7: Digital Modulation

S11. DIGITAL MODULATION PARAMETERS For each digital emission provide:

(a) Digital Mod. ID	(b) Emission Designator	(c) Assigned Bandwidth (kHz)	(d) No. of Phases	(e) Uncoded Data Rate (kbps)	(f) FEC Error Correction Coding Rate	(g) CDMA Processing Gain (dB)	(h) Total C/N Performance Objective (dB)	(i) Single Entry C/I Objective (dB)
M1	36M0G7W	36000	4	46480	0.7747		6.4	18.6

Page 8: Analog Modulation

[illegible]

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Page 9: Typical Emissions

S13. TYPICAL EMISSIONS For each planned type of emission provide:

Associated Transponder ID Range		Modulation ID		(e) Carriers per Transponder	(f) Carrier Spacing (kHz)	(g) Noise Budget Reference (Table No.)	(h) Energy Dispersal Bandwidth (kHz)	Receive Band (Assoc. Transmit Stn)			Transmit Band (This Space Station)			
		(c) Digital (Table S11)	(d) Analog (Table S12)					(i) Assoc. Stn. Max. Antenna Gain (dBi)	Assoc. Station Transmit Power (dBW)		EIRP (dBW)		(n) Max. Power Flux Density (dBW/m ² /Hz)	(o) Assoc. Stn Rec. G/T (dB/K)
(a) Start	(b) End								(j) Min.	(k) Max.	(l) Min.	(m) Max.		
KU001	KU024	M1		1				59.8	8	10	47	53		15.2
RB001	RB024	M1		1				64.7	11	16	46.4	52.4	-125	21.4
CMD1	CMD2		CMD	1				59.8	6.2	32.2				
TLM1	TLM2		TLM	1							10	15		35.9

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Page 10: TT and C

S14. Is the space station(s) controlled and monitored remotely? If Yes, provide the location and telephone number of the TT and C control point(s): #Error

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**Page 11:
Characteristics and
Certifications**

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a. Mass of spacecraft without fuel (kg):	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg):		
S15c. Mass of spacecraft and fuel at launch (kg):	S15f. Length (m):	S15i. Payload:
S15d. Mass of fuel, in orbit, at beginning of life (kg):	S15g. Width (m):	S15j. Bus:
S15e. Deployed Area of Solar Array (square meters):	S15h. Height (m):	S15k. Total:

S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:

Spacecraft Subsystem	Electrical Power (Watts) At Beginning of Life		Electrical Power (Watts) At End of Life	
	At Equinox	At Solstice	At Equinox	At Solstice
Payload (Watts):	(a):	(f):	(k):	(p):
Bus (Watts):	(b):	(g):	(l):	(q):
Total (Watts):	(c):	(h):	(m):	(r):
Solar Array (Watts):	(d):	(i):	(n):	(s):
Depth of Battery Discharge (%):	(e) %	(j) %	(o) %	(t) %

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?:	☒ YES	☐ NO	☐ N/A
b. Are the appropriate service area coverage requirements of § 25.143(b)(ii) and (iii), or § 25.145(c)(1) and (2) met?	☐ YES	☐ NO	☒ N/A
c. Are the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f)(1), (2) and (3) met?	☒ YES	☐ NO	☐ N/A

In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R. § 25.114.

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